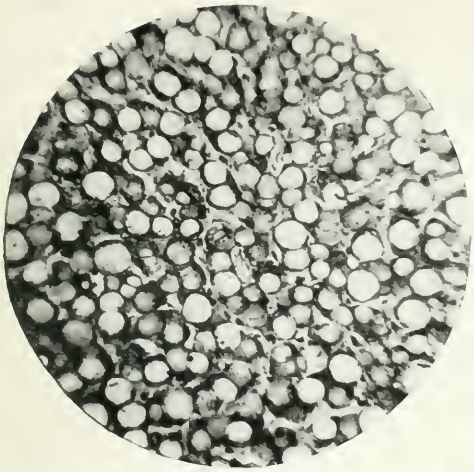

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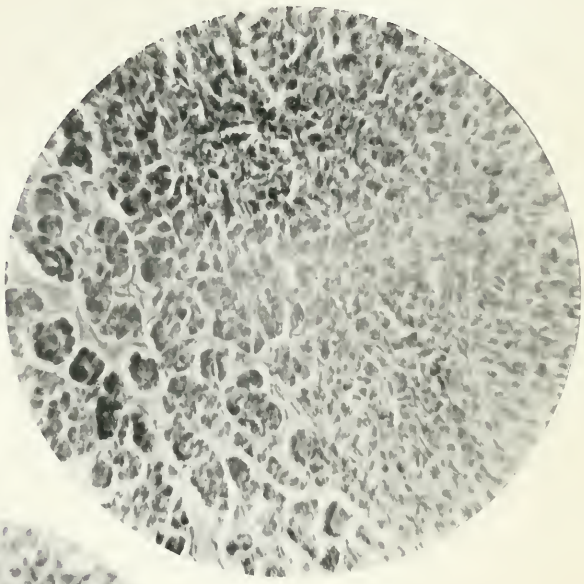

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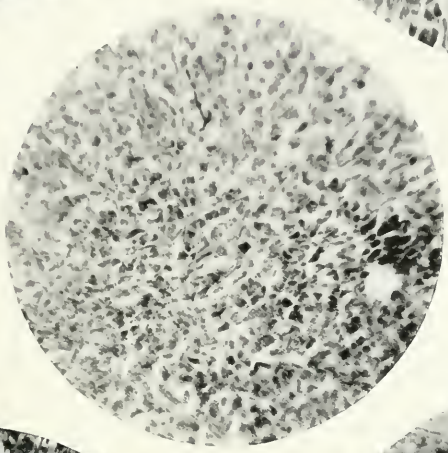

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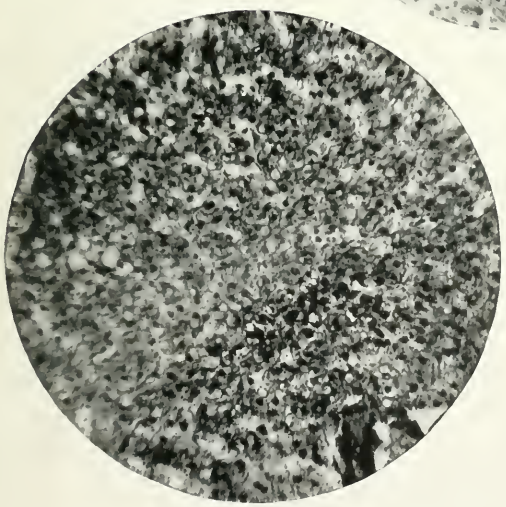

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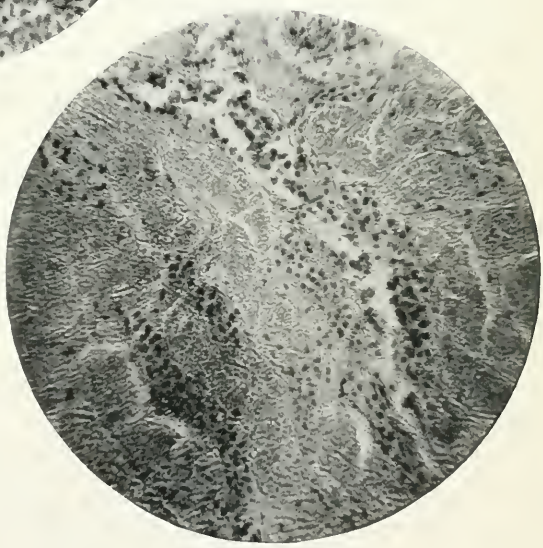

4

PATHOLOGY OF VOMITING SICKNESS.

(*a*) Specimens may be prepared in the ordinary way by mixing a fragment of faecal matter with a drop or two of water on a microscope slide and applying a coverslip. If this plan is followed the examination of fourteen slides is necessary before an individual can be pronounced free from infection (Clayton Lane, 1915).

(*b*) The specimen for the microscope may be prepared from the deposit that is left after a specimen of the faeces has been thrice shaken up in clean water and centrifuged (Billings, 1915).

(*c*) The specimen may be prepared from the scum that comes to the surface when the faecal residuum obtained by centrifuging with water and then with weak calcium chloride solution is finally centrifuged with a solution of calcium chloride of a specific gravity equal to 1·250 (Bass, 1909).

If either of these two latter plans is followed the examination of three slides should be sufficient.

(ii) Of the methods depending on the results obtained by the administration of anthelminthics there are also three that have found favour from time to time:—

(*a*) One may order a new course of treatment so often as the previous treatment has resulted in the expulsion of ankylostomes. [NOTE.—In this case one unnecessary treatment is always given to every patient.]

(*b*) One may calculate from the results of the first treatment the number of courses of treatment that will be required. Thus Leys (1912), using ninety grains of thymol divided into three doses, formulated the following rule:—'If 150 parasites or more are passed, three more courses are likely to be required; if 50 parasites or more, two more courses are required; if less than 50 parasites, then one more course is necessary.'

(*c*) Assuming that the effectiveness of certain anthelminthics is fairly constant (e.g. that 60 grains of thymol will remove 83 per cent. of the parasites present, while 30 grains of beta-naphthol will only remove 68 per cent.), it may be calculated that the number of worms left, even in a large infection, after two treatments by thymol, will be negligible, whereas it will require three treatments with beta-naphthol to produce the same result (Clayton Lane, 1915).

A brief consideration of these methods shows that all those in which the microscope is used to look for ova are tedious. They

do not exclude the possibility of male worms or immature worms being present, while the microscopic methods are either based on purely theoretical considerations or else depend on the observations made by a nurse—who in many cases is a 'native' and may not have been very careful.

It is obvious that there is room for

A SIMPLE AND RELIABLE TEST FOR DETERMINING THE PRESENCE OF ANKYLOSTOMES

The test suggested depends upon two facts:—(i) a trace of blood is constantly present in the faeces of ankylostomiasis patients, and (ii) there is a test for blood so sensitive as to reveal its presence in a dilution of 1 in 800,000.

The test is both simple and rapid, for the only reagents employed are the test solution and hydrogen peroxide, and half a dozen specimens can be examined in ten minutes. The reagent is prepared as follows:—100 c.c. of a 20 per cent. solution of caustic soda treated with 2 grammes of phenolphthalein and 10 grammes of zinc dust. The bright rose-coloured solution is heated gradually until it has assumed a slightly yellowish tone. The supernatant fluid is poured off into a coloured glass bottle and the access of air is prevented by the addition of a little liquid paraffin which floats on the top. The test is made as follows:—To 2 c.c. of a watery solution of the faeces is added 1 c.c. of the alkaline solution of phenolphthalin (i.e., reduced, and therefore colourless, phenolphthalein) and then 1 drop of hydrogen peroxide. In the presence of blood some of the phenolphthalin is re-oxidised to phenolphthalein and a bright red colour appears.

It is necessary to make sure, before applying the test, that the patients are not suffering from peptic ulcers, haemorrhoids or other gross lesion causing bleeding into the gastro-intestinal tract, and that they have not eaten meat* or blood during the previous 72 hours. In actual practice these points have not caused any real difficulty.

* This includes cockles which are a favourite condiment in Swatow and are often eaten in sufficient quantities to give rise to blood reaction in the faeces.

This test for occult blood is found in modern text-books (e.g. Simon, 1913), and the presence of blood in the faeces of ankylostome patients is one of the most rudimentary facts in connexion with this disease, so the writer can make no claim to originality; but he wishes to draw attention to this application of the test because it has so greatly simplified the treatment of ankylostomiasis patients.

In order to show how this test is used in our practice it may be well to give

AN OUTLINE OF THE PROCEDURE FOLLOWED IN TREATING PATIENTS SUFFERING FROM ANKYLOSTOMIASIS

A patient who presents himself at the out-patient department suffering from one or more of the symptoms which are commonly present in ankylostomiasis (e.g. anaemia, dyspepsia, giddiness, breathlessness, aching, etc.) is told to bring a specimen of his faeces on the first convenient occasion.

Generally the infection is so severe that ankylostome ova are found under the microscope in the first slide prepared from this specimen; but if this is not so, the patient is told to exclude meat and blood from his diet for three days and then bring a specimen again. If blood is found in this second specimen, or if eggs were present in the first, the patient is at once admitted for treatment.

The patient takes a light meal about 5 o'clock and at 7 o'clock is given a powder containing:—

Calomel	grs. III.
Phenolphthalein	grs. II.
Santonin	grs. IV.

The following morning no food is allowed, and at 6 and at 8 he is given 40 grains of beta-naphthol suspended in peppermint water by mucilage of tragacanth. At 10 a.m. 30 grains of thymol* is administered in capsules, and at 12 noon a draught of magnesium sulphate (from six drachms to one ounce) in hot water. If the bowels do not move before 3 p.m. the dose of saline is repeated then.

* This combination of drugs (Beta-naphthol 80 grains and Thymol 40 grains) has proved more efficient than 120 grains of Beta-naphthol, and causes less anxiety than the administration of 90 grains of Thymol. If the latter drug is administered in so large a dose, any delay in securing free movement of the bowels must cause considerable anxiety, since the most efficient purgative in the pharmacopoeia—castor oil—is contra-indicated, and if the Thymol is not evacuated soon, it may be absorbed in sufficient quantity to cause fatal cardiac weakness.

As a rule the patient chooses to go home that evening, and presents himself at hospital on the next out-patient day.

If more than 250 ankylostomes have been expelled at the first treatment it is certain that a second treatment will be required; this may take place about seven days after the first. It is carried out in the same manner as the first, with the exception that no santonin is given in the evening powder.

If the first treatment has produced a smaller number than 250, then the patient is told, about a week after the first treatment, to refrain from all meat and blood for three days and to bring a specimen of his faeces at the end of that period. No time is spent in examining this for ova, but it is at once tested for blood, and if this is present, a second treatment is ordered—to be carried out as described above.

About ten days later a specimen is again brought (after three days' abstention from blood and meats), and if blood is still present, treatment is again repeated.

Thus the cycle consists of four parts:—

(1) Anthelminthic treatment.
(2) A week of ordinary diet.
(3) Three days' abstention from blood and meat.
(4) An examination of the faeces for blood, going back to (1) Anthelminthic treatment, as often as blood is found in the faeces.

This routine is followed till blood is no longer present in the faeces, and so the cycle is broken. As soon as this happens the anthelminthic part of the treatment is at an end, and attention may be concentrated upon building up the patient's impoverished blood. For this purpose we find nothing more effective than freshly prepared Blaud's pills, of which we use about 3,000 to 4,000 a week.

Altogether the test has been applied 1,636 times in the faeces of 500 ankylostome patients during the last twelve months. Of the last 100 patients who have completed their treatment (i.e. have remained under observation till their faeces were free from blood):—

50 cases required only one treatment,
30 cases required two treatments.
12 cases required three treatments,
6 cases required four treatments,
1 case required six treatments, and
1 case required eight treatments.

The sensitiveness of the test is shown by the fact that often less than twenty worms were expelled in the last treatment the patient received, i.e. so small a number of ankylostomes were able to give rise to an amount of blood sufficient to be detected by this test.*

For immigration officers and others who require an absolute guarantee that not one female worm is present in the intestine, this test may be deemed inadequate, for a few worms may be present in an individual whose faeces contain no blood. However, if it is first applied (with the proper safeguards) to all those who are to be examined, the troublesome microscopical examination of the faeces instead of being required for all the individuals will only be necessary in the case of those whose stools show no signs of blood. The amount of time thus saved will be considerable.

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* Possibly a fallacy underlies this. It is well known that the wounds made by ankylostomes in the intestinal mucosa may continue to bleed for some time after the worms have been removed. It may be expected that this haemorrhage will have ceased within a week and will not give rise to the presence of blood in the specimen of faeces examined ten days after the ankylostomes have been expelled. It may be that in some cases either a pyogenic infection has taken place, or an ulcerative process has been set up, or the patient is so debilitated that there is delay in the healing of the ankylostome wounds, and so blood is found in the faeces although parasites are no longer present in the intestine.